Claims

1. A time domain radio transmission system comprising:

a radio transmitter comprising:

pulse generating means for generating a series of pulses spaced by time,

a broadband transmitting antenna comprising a pair of generally triangularly contoured, when measured in a plane, elements, and wherein bases of the pair are parallel and adjacent,

a source of D.C. power, and

switching means responsive to said pulse generating means and coupled to said source of D.C. power and connected across and between said closely adjacent bases of said antenna for switching power between states of applied power and no applied power to said transmitting antenna, and thereby generating a series of time space positioned, A.C. carrierless burst signals, and transmitting them into free space;

a radio receiver comprising:

a receiving antenna comprising a pair of generally triangular contoured, when measured in a plane, elements, and wherein bases of the pair are closely adjacent, and a received signal being available across said bases, and

detection signal generating means responsive to timing signals for generating a detection signal;

timing means for deriving and supplying said timing signals to said detection signal generation means as a function of the time of occurrence of transmission of said A.C. carrierless burst signals;

signal mixing and integration means responsive to signals from across said bases of said receiving antenna and said detection signals for providing an output which is a function of a discrete relation between said detection signals and received signals; and

indication means for indicating said output.

2. A system as set forth in claim 1 wherein said switching means comprises:

a layer of normally high-resistive but light-responsive, low-resistance material;

a pair of spaced electrodes on and coupled to said bases of said transmitting antenna; and

trigger means comprising light source means responsive to said pulse generating means for applying a discrete increment of light to said layer of material of a character wherein said material transitions from a non-conductive to a conductive state between said electrodes.

3. A system as set forth in claim 2 wherein said switching means is positioned adjacent said transmitting antenna.

4. A system as set forth in claim 2 wherein:

said switching means is positioned adjacent said bases of said transmitting antenna; and

said system includes light tube means for coupling light from said trigger means to said material of said switching means.

5. A system as set forth in claim 2 wherein said material is diamond.

6. A system as set forth in claim 1 wherein said pulses generated by said pulse generating means are irregular in time

spacing.

7. A system as set forth in claim 6 wherein the spacings of said pulses are at irregularly spaced time intervals.

8. A system as set forth in claim 1 wherein said timing means is responsive to said series of pulses of said pulse generating means.

9. A time domain radar system comprising:

broadband antenna means including a pair of terminals for coupling radio signals between space and said pair of terminals;

a radio transmitter comprising:

pulse generating means for generating a series of pulses at irregular times,

a source of D.C. power, and

switching means responsive to said pulse generating means and coupled to said source of D.C. power and connectable to said pair of terminals of said broadband antenna means for switching between states of applied power and no applied power to said antenna means whereby varingly-spaced, A.C. carrierless burst signals are transmitted into space;

a radio receiver comprising:

radio receiving means coupled to said broadband antenna means for receiving return signals appearing at an elapsed time following signal transmissions, which elapsed time is the time of transmission of an A.C. carrierless burst signal from said broadband antenna means to a target at a selected distance plus return time back to said broadband antenna means,

detection signal generating means responsive to timing signals for generating a detection signal,

timing means responsive to the time of transmission of a set of burst signals for generating, as a set, said timing signals, each of a said set being of a like said elapsed time, and coupling said timing signals to said detection signal generation means, and

signal mixing and integration means responsive to a set of return signals from said broadband antenna means and a set of detection signals responsive to a said set of timing signals for providing a discrete output signal which is a function of the time identity between a said set of received return signals and detection signals;

bandpass filter means responsive to said signal mixing and integration means for providing a signal output responsive to a selected range of frequencies; and

indication means responsive to the output of said bandpass filter means for indicating the presence of a target moving within a selected range of velocities and at a selected range.

10. A system as set forth in claim 9 wherein said antenna means comprises at least one antenna, in turn comprising at least one pair of generally triangularly contoured, when considered in a plane, elements, and wherein bases of the pair are closely adjacent.

11. A system as set forth in claim 10 wherein said antenna means comprises a transmitting antenna coupled to said switching means and a receiving antenna coupled to said radio receiving means,and each of said antennas comprises at least one pair of generally triangularly contoured, when considered in a plane, elements, and wherein triangular bases of the pair are closely

adjacent.

12. A wideband electromagnetic system comprising:

generating means for generating stepped wave signals;

transmitting means responsive to said stepped wave signals for transmitting wideband burst signals;

a wideband antenna coupled to a medium through which said burst signals propagate, and said wideband antenna comprising at least one dipole in turn comprising two ele each element characterized by having a broad base and narrow apex, and wherein the bases are parallel and adjacent; and

receiving means including coupling means connected across said elements of said wideband antenna for detecting signals derived from said burst signals.

13. A system as set forth in claim 12 wherein said receiving means comprises coherent detection means responsive to times of initiation of said burst signals for coherently detecting said signals and, separately, integrating a plurality of coherently detected signals and thereby indicating the existence of a target.

14. A system as set forth in claim 12 wherein said coupling is to the bases of said antenna elements.

15. A wideband transmission system comprising:

generating means for generating generally stepped wave signals;

transmitting means including a broad frequency band radiator and, responsive to said stepped wave signals, for transmitting wideband burst signals into a selected medium; and

receiving means responsive to signals derived from

transmitted said burst signals and to times of intiation of said burst signals for coherently detecting said burst signals and, separately, integrating a plurality of coherently detected signals and thereby deriving an intelligence signal.

~~16.~~ 2 A system as set forth in claim ~~15~~ 11 wherein said system includes reciprocal electrical-signal-to-sonic translation means and said last-named means includes said broad frequency band radiator, and said receiving means includes signal means responsive to said reciprocal electrical-signal-to-sonic translation means and to said times of initiation of said burst signals for coherently detecting said signals.

~~17.~~ 11 A system as set forth in claim ~~15~~ 11 wherein said medium is a liquid.

~~18.~~ 3 A system as set forth in claim ~~16~~ 2 wherein said medium is a liquid.

~~19.~~ 5 A system as set forth in claim ~~15~~ 11 wherein said broad frequency band radiator comprises a broadband light radiator.

~~20.~~ 6 A system as set forth in claim ~~19~~ 5 wherein said broadband-frequency band radiator comprises:

a laser;

a light modulator comprising:

an elongated optical channel having an entrance end for receiving light from said laser and a light exiting end and having a refractive index variable by an electrical field, and

conductive means extending along said optical channel for applying an electrical field to said optical channel;

signal means for generating a generally ramp-shaped voltage

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and applying said voltage to said conductive means generally in the region of said exiting end of said channel; and

a dispersive medium disposed to intercept the output of said channel and emit a responsive beam which is characterized by a broad spectrum of light.

21. A light modulation system comprising:

a source of narrow band light;

an elongated optical channel having an entrance end for receiving light from said source and an exiting end and having a refractive index variable by an electrical field;

conductive means extending along said optical channel for applying an electrical field across said optical channel; and

signal means for generating a modulation signal and applying said signal to said conductive means in a region adjacent said exiting end of said optical channel and thereby creating said electrical field therein;

whereby light from said light source passing from said entrance end to said exit end of said optical channel is affected by said electrical field, whereby the frequency of light passing through said optical channel is varied in frequency as a function of said signal.

22. A system as set forth in claim 21 wherein said conductive means comprises first and second elongated conductors positioned on opposite sides of said optical channel.

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